

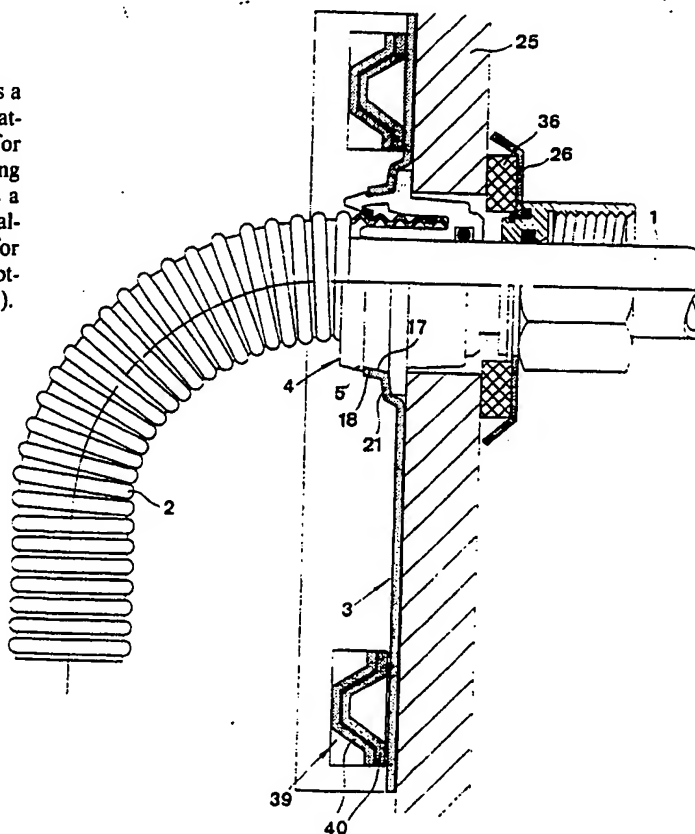


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|   |           |   |
|---|-----------|---|
| <b>(51) International Patent Classification <sup>5</sup> :</b><br><br><b>F16L 5/02, 39/00</b>   | <b>A1</b> | <b>(11) International Publication Number:</b> <b>WO 92/11484</b><br><br><b>(43) International Publication Date:</b> 9 July 1992 (09.07.92)  |
| <b>(21) International Application Number:</b> PCT/SE91/00872<br><b>(22) International Filing Date:</b> 18 December 1991 (18.12.91)<br><b>(30) Priority data:</b><br>9004098-1                      21 December 1990 (21.12.90) SE<br><b>(71) Applicant (for all designated States except US):</b> DEPEX AB [SE/SE]; Box 104, S-730 70 Västerfärnebo (SE).<br><b>(72) Inventor; and</b><br><b>(75) Inventor/Applicant (for US only) :</b> SKÅRUD, Roland [SE/SE]; Ringduvegatan 137, S-724 70 Västerås (SE).<br><b>(74) Agent:</b> BJERKÉN, Jari, Håkan; Bjerkéns/Gävle Patentbyrå AB, Box 304, S-801 04 Gävle (SE). |           | <b>(81) Designated States:</b> AT (European patent), BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), MC (European patent), NL (European patent), NO, SE (European patent), US.<br><br><b>Published</b><br><i>With international search report.</i><br><i>In English translation (filed in Swedish).</i> |

**(54) Title:** A DEVICE IN LINE SYSTEMS FOR FLUIDS**(57) Abstract**

A device in conduit systems comprises a fluid conduit (1), a tube (2) surrounding the latter, a fastening member (3) and means (4) for attaching the tube with respect to the fastening member. The attaching means (4) comprises a coupling member, which is arranged to be sealingly coupled to the tube, has means (5) for coupling to the fastening member and is adapted to sealingly cooperate with the conduit (1).



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

|     |                          |    |                                       |                 |                          |
|-----|--------------------------|----|---------------------------------------|-----------------|--------------------------|
| AT  | Austria                  | ES | Spain                                 | MG              | Madagascar               |
| AU  | Australia                | FI | Finland                               | ML              | Mali                     |
| BB  | Barbados                 | FR | France                                | MN              | Mongolia                 |
| BE  | Belgium                  | GA | Gabon                                 | MR              | Mauritania               |
| BF  | Burkina Faso             | GB | United Kingdom                        | MW              | Malawi                   |
| BG  | Bulgaria                 | GN | Guinea                                | NL              | Netherlands              |
| BJ  | Benin                    | GR | Greece                                | NO              | Norway                   |
| BR  | Brazil                   | HU | Hungary                               | PL              | Poland                   |
| CA  | Canada                   | IT | Italy                                 | RO              | Romania                  |
| CF  | Central African Republic | JP | Japan                                 | SD              | Sudan                    |
| CG  | Congo                    | KP | Democratic People's Republic of Korea | SE              | Sweden                   |
| CH  | Switzerland              |    |                                       | SN              | Senegal                  |
| CI  | Côte d'Ivoire            | KR | Republic of Korea                     | SU <sup>+</sup> | Soviet Union             |
| CM  | Cameroon                 | LI | Liechtenstein                         | TD              | Chad                     |
| CS  | Czechoslovakia           | LK | Sri Lanka                             | TG              | Togo                     |
| DE* | Germany                  | LU | Luxembourg                            | US              | United States of America |
| DK  | Denmark                  | MC | Monaco                                |                 |                          |

<sup>+</sup> Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

A DEVICE IN LINE SYSTEMS FOR FLUIDS.

#### FIELD OF THE INVENTION AND PRIOR ART

This invention relates to a device in conduit systems for fluids, for example water, comprising a fluid conduit, a tube surrounding the latter, a fastening member and means for attaching the tube with respect to the fastening member.

Such devices are substantially already known. The point of surrounding the fluid conduit by a tube resides in the fact that a possible leakage of fluid from the conduit will end up inside the surrounding tube and accordingly not reach into adjacent constructions and cause serious damages there. The fluid or water leaking out into the space between the conduit and the tube may easily be drained, for instance to a draining gutter or the like, without any risk of damages and suitably also so that the fluid or water leaking is observed by the persons or staff involved.

Known devices of the type mentioned in the introduction are subjected to several deficiencies with respect to the means for attaching the tube with respect to the fastening member, which in the practice is intended to serve for attaching armatures such as taps, blenders, coupling devices etc. More exactly, the attaching means are extremely complicatedly constructed in that they consist of a plurality of metallic threaded nipples mutually engaged, which are comparatively expensive to manufacture and besides that troublesome to mount. The known devices have also the short-coming of being comparatively exposed to damages caused

by loads, i.e. damages as a consequence of loads on armatures connected to the conduit outside the fastening member.

#### SUMMARY OF THE INVENTION

The object of the present invention is according to a first aspect to develop the art already known to the degree that the means for attaching the tube to the fastening member get a construction functioning efficiently but being low in price in spite thereof, wherein also the mounting shall be easy to carry out.

According to a second aspect of the invention the object thereof is to show ways to couple the conduit to the armatures etc. wanted in a stable and leakage safe way.

The device is given the characteristics related to in claim 1 in order to obtain the object of the invention according to the first aspect. One single coupling member may by that ensure the connecting and sealing coupling functions required.

The object of the invention according to the second aspect is obtained by the definitions in claim 14. The coupling of the conduit to the armature desired may by that be accomplished by means of one coupling means rotatably secured to a covering sheet, which in its turn is secured to the fastening member, wherein sealing means seal on one hand between the coupling means and the covering sheet and on the other between the coupling means and the conduit. Since as a rule a construction board or the like is present between the covering sheet and the fastening member, the sealing means ensures that a possible fluid leakage between the coupling means and the armature may not penetrate into the construction board.

Further objects of the invention and characteristics and advantages thereof will appear from the dependent claims and the following description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the appended drawings below follows a specific description of a preferred embodiment of the invention cited as an example.

In the drawings:

Fig 1 is a cross section through the device according to the invention with portions thereof broken away,

Fig 2 is a view which at the top illustrates the coupling member according to the invention and below a portion thereof on a substantially enlarged scale,

Fig 3 is a detail view on a larger scale illustrating the construction at the right part in Fig 1,

Fig 4 is a perspective view illustrating a fastening member according to the invention and

Fig 5 is a perspective view of the fastening member seen from the rear side.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Although the device according to the invention is adaptable to conduit systems for any fluids, liquids as well as gases, the perhaps most important practical application, namely for water conduit systems in buildings, will in the following be described for a not limitative purpose.

As it appears from Fig 1, the device comprises a water conduit 1. This consists preferably of plastic, although also other material are possible. This conduit 1 is at least substantially surrounded by a tube 2. The task of this tube is to collect water leaking out of the conduit 1 by possible leakage therein and divert or

drain it in such a way that no water damages in the building are produced. The extension of the conduit 1 and the tube 2 is suitably made so that water possibly leaking out of the conduit 1 will be drained by the tube 2 to the drainage system of the building.

The device comprises a fastening member 3 which in a way which will be described later is intended to be secured in the building in question, mostly in a wall therein. There are means for attaching the tube 2 with respect to the fastening member 3. Thus, the fastening member 3 is consequently intended to exert a holding influence upon the tube 2 and in the practice also upon the conduit 1 and also upon water conduit armatures, i.e. water fittings, coupling apparatuses etc., which are intended to enter into water communicating connection with the conduit 1.

The attaching means 4 comprises (see Fig 1 and 2) a coupling member, which is arranged to be sealingly coupled to the tube 2. The coupling member 4 has thereto means 5 for coupling to the fastening member 3 and is also arranged to sealingly cooperate with the conduit 1.

The interconnecting means 6 of the coupling member 4 for establishing coupling of the coupling member 4 with respect to the tube 2 could be arranged to act couplingly directly to the tube 2, for example while cooperating with an annular bead arranged on the outside thereof, but it is in this example preferred that the interconnecting means 6 of the coupling member 4 cooperate with a connecting member 7, which in its turn is connected to the tube 2. Independently of which of these constructions is chosen, it is preferred that the interconnecting means 6 and outer portions of the tube 2 or as an alternative the connecting member 7 cooperate with each other as snap-in locking means. As it appears especially from Fig 2, the interconnecting means 6 on the coupling member 4 have the character of an annularly extending hook, which is intended to hook to the connecting member 7 and has an inclining ramp 8 arranged to on pushing the coupling member 4 on

the extremity of the tube 2 make it easier to the hook means 6 to slide over the connecting member 7 and hook to the same in such a way that the connection may suitably not be loosened without destruction of the parts.

The annular hook means 6 is made on an annular tongue 9 extending substantially axially on the coupling member 4. This tongue 9 is slightly radially resilient as a consequence of a comparatively thin base portion 10 thereof.

As it appears from Fig 2, it is in the example preferred that also the connecting member 7 has a ramp-like inclining surface 11, the inclination of which is such that it makes it easier to the hook means 6 to slide over the connecting member. It is understood that the inclining ramp 11 could be omitted or that as an alternative the inclining ramp 8 could be omitted.

The connecting member 7 and the tube 2 are here not made from one single piece, which could be possible in other embodiments, but said member is here a ring arranged in an external ppheriferal groove 12 in the tube 2. This ring is conceived to be broken through on a place along the circumference thereof so as to make it easier to put the ring 7 around the tube 2.

It is also preferred that the tube 2 is made of plastic. It is then suitable that the tube 2 has a mantle which is at least externally waved in that it has a plurality of alternating ridges and tales extending around the tube 2, one of said tales forming the groove 12. It is visible in Fig 2 that the wave form of the mantle of the tube may go through the tube in the sense that it also appears on the inner side of the tube 2.

A sealing means 13 acts sealingly between the tube 2 and the coupling member 4. The sealing means 13 is annular and could in other embodiments be placed in a groove in the coupling member 4, but the sealing means 13 is in the embodiment illustrating here

received in a circumferential external groove 14 in the tube 2. The sealing means 13 may for example be constituted by an O-ring.

An end portion of the tube 2 is received in a space 15 with an annular cross section in the coupling member 4. The sealing member 13 is located deeper inside the space 15 than the connecting member 7. The space 15 is radially inwardly delimited by a circular portion 16 of the coupling member and radially outwardly at least partially by the annular tongue 9. It is desirable that the circular portion 16 internally supports the tube 2 in the region of the engagement of the hook means 6 with the tube 2 or the connecting member 7.

The means 5 of the coupling member 4 for coupling to the fastening member 3 and the edge portion 18 delimiting a hole 17 (Fig 1) in the fastening member function as cooperating snap-in locking means, which upon pressing the coupling member 4 axially into the hole 17 enter into mutually locking engagement. It is preferred that the coupling means 5 on the coupling member 4 has the character of an annular hook, which in the locked position according to Fig 1 grips behind the edge portion 18. The coupling member 4 has in the introduction direction in front of the hook means 5 an inclined ramp 19 so as to facilitate the passage of the hook means 5 through the hole 17. Furthermore, it is noted that the introduction is facilitated by the fact that the tongue on the coupling member 4, on which the hook means 5 is arranged, is slightly radially resilient. As appears from Fig 1, the hole 17 has also a width decreasing in the introduction direction for the coupling member 4 (in particular a conical shape). A radial rib 20 bears in the interlocked state of the coupling member 4 against the fastening member portion 21 being slightly countersunk, said portion joining the edge portion 18 delimiting the hole 17.

The coupling member 4 has an axial passage 22 for the conduit 1. A groove 23 for a sealing ring 24 is arranged in a wall delimi-



ting this passage. Thus, this ring bears against the outside of the conduit 1.

As appears from Fig 1, a construction board 25 will normally be applied on the outer side of the fastening member 3. This board 25 is then intended to form the outer side of a wall, in the interior of which the conduit 1 and the tube 2 extend and the fastening member 3 is mounted.

A covering sheet 26 is securable to the fastening member 3 (Fig 1 and 3). This covering sheet 26 is meant to be attached to the fastening member 3 by means of screws not shown, which extend through bores in the covering sheet 26 and with their threads engaged into holes 27 arranged in the fastening member 3 (Fig 4). It is understood that each separate covering sheet 26 will cooperate with two conduits 1 for coupling to fittings or elements, such as water mixers or taps, for both warm and cold water. More than two holes 17 are suitably arranged in the fastening member 3 with such mutual dimensions that the water fittings and elements existing on the market may be connected.

It appears from Fig 1 and 3 that a covering sheet 26 has a coupling means 28 rotatably attached to the covering sheet, said means having a through-hole 29 for the conduit 1. The coupling means 28 has a portion 30 projecting into and partially through a hole 31 in the covering sheet 26. The portion 30 has an annular groove and a locking ring 32 inserted therein in order to prevent this portion 30 from escaping out of the hole 31 again, so that the covering sheet 26 by a portion will be located between the locking ring 32 and a shoulder on the coupling means 28 directed axially. The clearance is such that the coupling means 28 may be freely rotated. An annular groove, in which an annular sealing means 34 is received, is arranged in the surface 30 of the coupling means 28 directed axially and facing the front side of the covering sheet 26. Thus, this sealing means is arranged to seal between the coupling means 28 and the covering sheet 26. A second annular sealing means 35 is arranged to seal between the

coupling means 28 and the outer side of the conduit 1. This sealing means 35 is received in a groove arranged internally in the coupling means 28. The sealing means 34 and 35 prevents leakage from taking place inwardly into the wall through the hole 31 in the covering sheet externally of the conduit 1.

The covering sheet 26 is for the rest intended to cooperate with a sealing disc 36, which is intended to be sealingly jammed between the construction board 25 and the covering sheet 26.

A coupling means 28 is intended to be used for coupling to any fitting or element or further coupling details, so that a water communication between these and the conduit 1 is established. The coupling means 28 in this case made as a nut is illustrated as having an internal thread adapted to be coupled to other parts, so that a sealing clamping connection to the conduit 1 is established in a way well known per se within the field.

As it appears from Fig 3, the coupling means 28 may have a channel 37 extending from the groove for the sealing ring 35 to the external surface of the coupling means 28. This channel 37 is adapted to serve as a telltale conduit in that water may leak out through this should a leakage be established outside the sealing ring 35, i.e. between the coupling means 28 and some further parts connected thereto.

An example of a possible embodiment of the fastening member 3 is illustrated in Fig 4 and 5. It appears that this may have a plate means 38, in which the holes 17, 27 are arranged. Furthermore, the fastening member has fastening rails 39, the length of which is adjustable and along which the plate means 38 is displaceable. Each separate rail 39 comprises in the example two rail parts 40, which may have elongated countersinks 41 and which are disposed upon each other as visible in Fig 1. The rail parts 40 extend through openings 42 in lateral flanges 43 bent with respect to the front surface of the plate means 38. The entire plate means 38 is adapted to be laterally displaceable on the rails 39 and

each separate rail 39 may besides that be prolonged and shortened, respectively, by pulling the rail parts 40 out and pushing them together. These have at their ends fastening means 44, for example holes for nails or screws. The fastening member 3 is adapted to be secured to girders or the like being a part of the wall in question by means of these means 44. The position of the plate means 38 between these girders may then be laterally adjusted.

An installation of a device according to the invention is carried out in the following way: when the girders of the wall in question has been arranged, the fastening member 3 is attached to two adjacent girders at the place aimed at and the drawing or application of the conduit 1 and the tube 2 is carried out. One coupling member 4 is applied for each set of conduit 1/tube 2 and the coupling member 4 is more exactly firstly threaded onto the conduit 1 and the coupling member 4 is then pushed onto the end of the tube 2, but it is of course taken for granted that the connecting member 7 and the sealing means 13 have been previously applied. The pushing of the coupling member 4 onto the tube 2 gives rise to a permanent and safe connection. The coupling member 4 is after that pushed into the hole 17 in the fastening member 3, so that the hook means 5 of the coupling member enters into engagement with the fastening member. The construction board 25 is after that applied over the fastening member 3, wherein the holes in the board are carried out in correspondence with the projecting portions of the coupling member 4. The covering sheet 26 with the coupling nuts 28 belonging thereto is after that applied, said sheet 26 being attached to the fastening member 3 by screws engaging the holes 27 of the fastening member. Finally, the coupling nuts 28 are connected to the water fittings or the like in question.

The invention is of course not restricted only to the embodiment described, but several modifications would be possible within the scope of the inventional idea. Although it is preferred to make a

coupling member 4 from one single material piece of plastic, it would also be conceivable to make the same of metal.

Claims

1. A device in conduit systems for fluids, for example water, comprising a fluid conduit (1), a tube (2) surrounding the latter, a fastening member (3) and means (4) for attaching the tube (2) with respect to the fastening member (3),  
c h a r a c t e r i z e d in that the attaching means (4) comprises a coupling member, which

a) is adapted to be sealingly coupled to the tube (2),

b) has means (5) for coupling to the fastening member (3) and

c) is adapted to sealingly cooperate with the conduit (1).

2. A device according to claim 1,  
c h a r a c t e r i z e d in that interconnecting means (6) of the coupling member (4) and the tube (2) for one or several members (7) associated therewith cooperate with each other as snap-in locking means.

3. A device according to claim 1 or 2,  
c h a r a c t e r i z e d in that the coupling member (4) has means (6) for interconnecting it with a connecting member (7), which in its turn is connected to the tube (2).

4. A device according to claim 2 or 3,  
c h a r a c t e r i z e d in that the connecting member (7) consists of a ring arranged in an external groove (12) in the tube.

5. A device according to any of the preceding claims,  
c h a r a c t e r i z e d in that a sealing means (13) acts sealingly between the tube (2) and the coupling member (4).

6. A device according to claim 5,  
c h a r a c t e r i z e d in that the sealing means (13) is  
arranged in an external groove (14) in the tube.

7. A device according to any of the preceding claims,  
c h a r a c t e r i z e d in that an end portion of the tube (2)  
is received in a space (15) in the coupling member (4) having an  
annular cross section.

8. A device according to any of the preceding claims,  
c h a r a c t e r i z e d in that the means (5) of the coupling  
member (4) for coupling to the fastening member (3) and the edge  
portion (18) of the hole (17) in the fastening member function as  
cooperating snap-in locking means.

9. A device according to claims 2 or 3 and 8,  
c h a r a c t e r i z e d in that the means (6, 5) of the  
coupling member (4) for interconnection thereof with a tube (2)  
or the connecting member (7) and for coupling to the fastening  
member (3) are made on a tongue (9) of the coupling member  
extending substantially axially.

10. A device according to any of the preceding claims,  
c h a r a c t e r i z e d in that the coupling member (4) has an  
axial passage (22) for the conduit and that a groove for a seal  
ring (24) is arranged in a wall delimiting this passage.

11. A device according to any of the preceding claims,  
c h a r a c t e r i z e d in that a covering sheet (26) is  
securable to the fastening member (3) and has a coupling means  
(28) rotatably secured to a covering sheet, the last mentioned  
means having a through-hole (29) for the conduit (1).

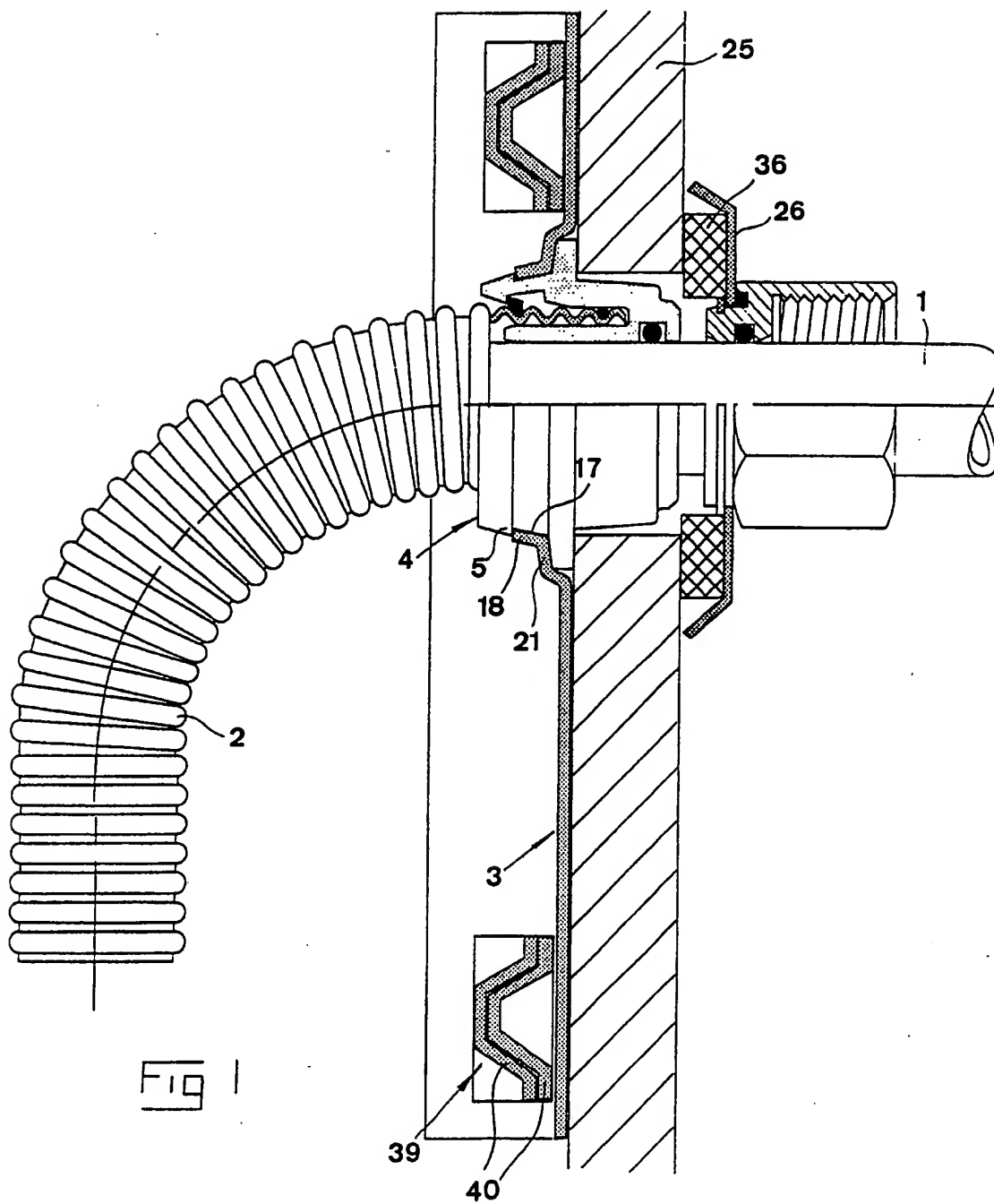
12. A device according to claim 11,  
c h a r a c t e r i z e d in that a first annular sealing means  
(34) is arranged to seal between the coupling means (28) and the  
covering sheet (26) and that a second annular sealing means (35)

is arranged to seal between the coupling means (28) and the conduit (1).

13. A device according to any of the preceding claims, characterized in that the fastening member (3) comprises a plate means (38) and at least a fastening rail (39), the length of which is adjustable and along which the plate means (38) is displaceable.

14. A device in conduit systems for fluids, for example water, comprising a fluid conduit (1), a tube (2) surrounding the latter, a fastening member (3) and means (4) for attaching the tube to the fastening member and sealing between the tube (2) and the conduit (1),

characterized in that a covering sheet (26) is securable to the fastening member (3) and has a coupling means (28) rotatably secured to the covering sheet (27), the last mentioned means having a through-hole (29) for the conduit, that a first annular sealing means (34) is arranged to seal between the coupling means (28) and the covering sheet (26) and that a second annular sealing means (35) is arranged to seal between the coupling means and the conduit (1).





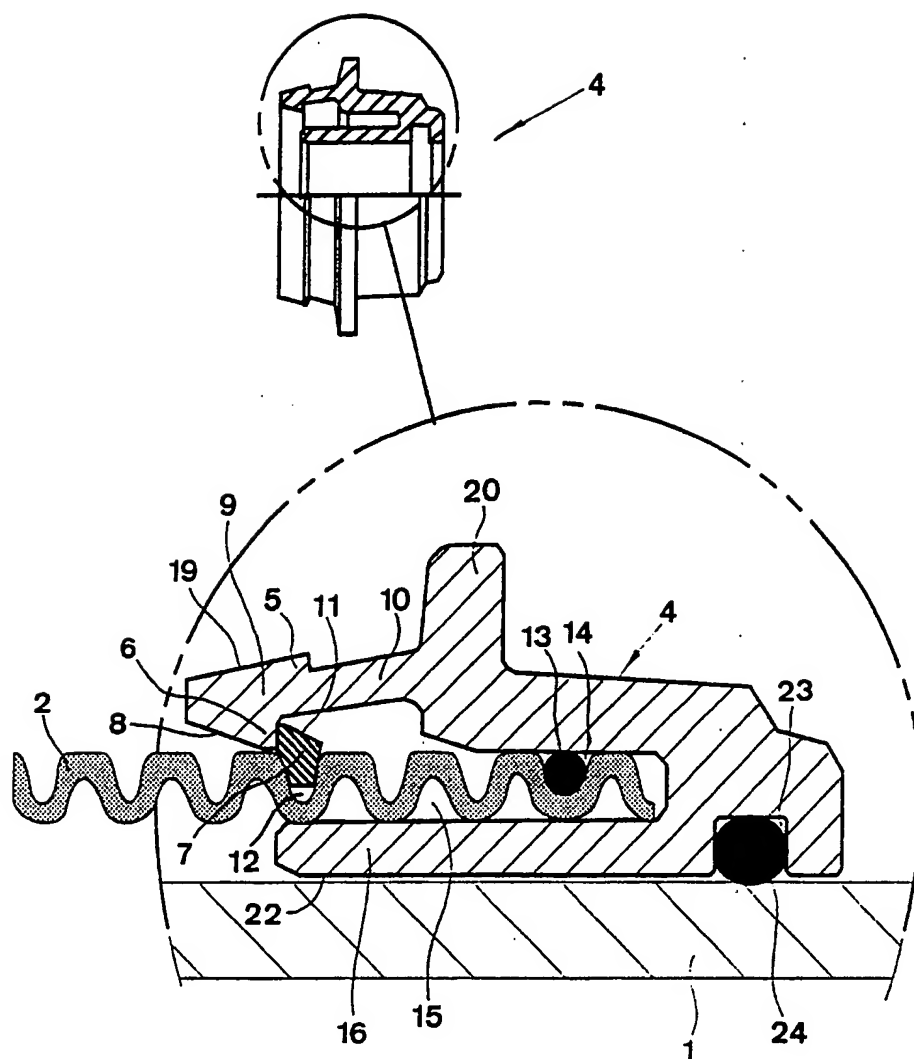


Fig 2

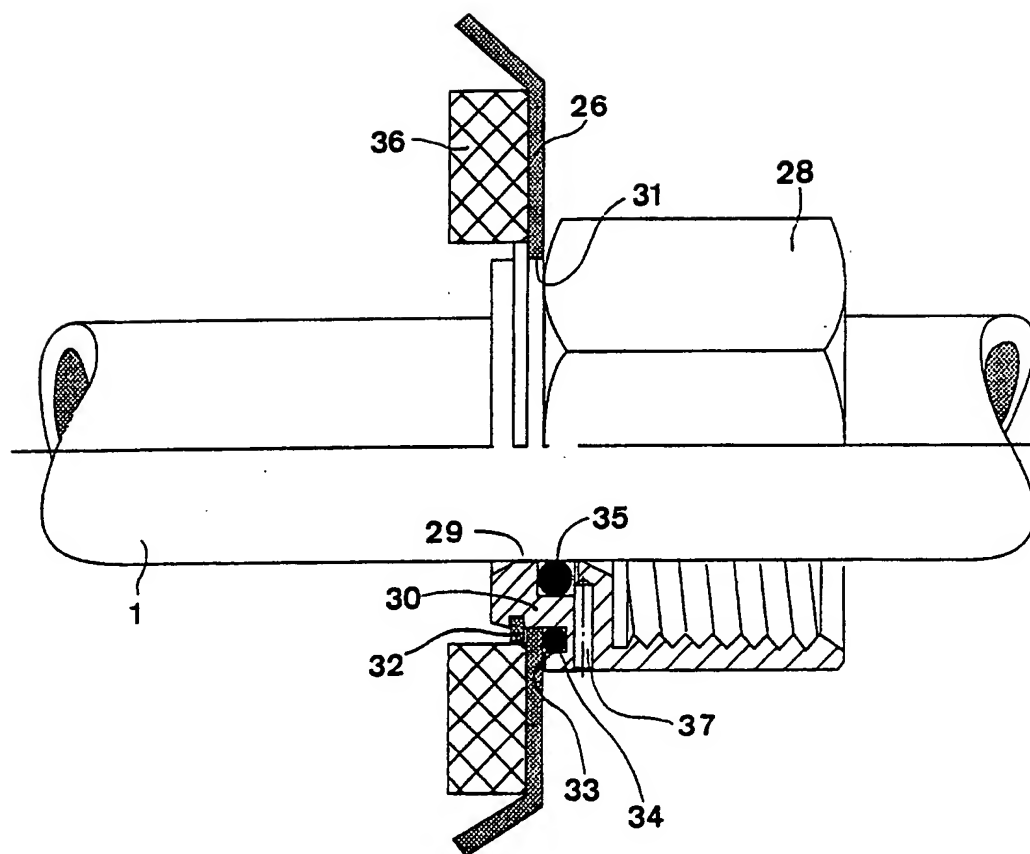
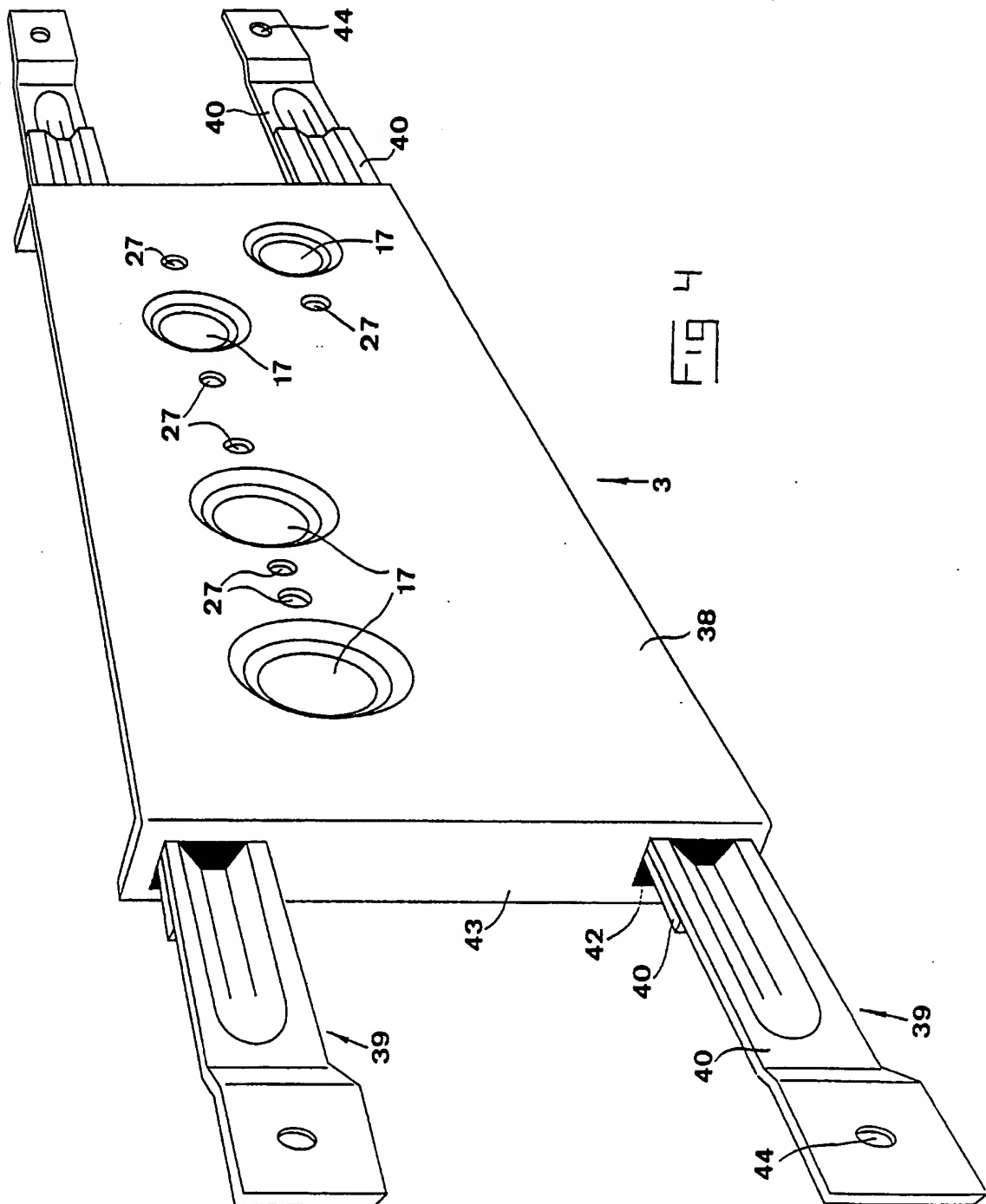
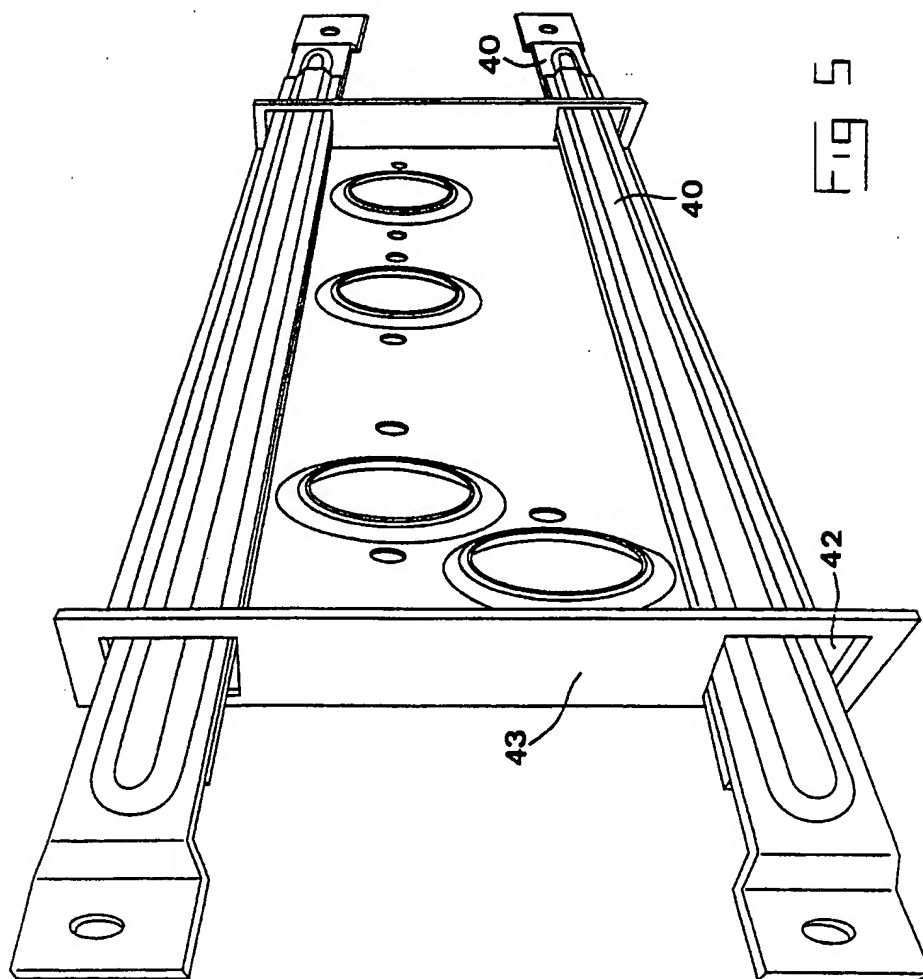


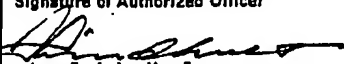
Fig 3





# INTERNATIONAL SEARCH REPORT

International Application No. PCT/SE 91/00872

| <b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup><br>According to International Patent Classification (IPC) or to both National Classification and IPC<br>IPC5: F 16 L 5/02, 39/00   |   |                                     |                       |                        |      |        |
|--|---|-------------------------------------|-----------------------|------------------------|------|--------|
| <b>II. FIELDS SEARCHED</b><br><div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Minimum Documentation Searched<sup>7</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border: 1px solid black;">Classification System</th> <th style="border: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; height: 40px; vertical-align: bottom;">IPC5</td> <td style="border: 1px solid black; vertical-align: bottom;">F 16 L</td> </tr> </table> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched<sup>8</sup></div>   |   |                                     | Classification System | Classification Symbols | IPC5 | F 16 L |
| Classification System  | Classification Symbols  |                                     |                       |                        |      |        |
| IPC5   | F 16 L  |                                     |                       |                        |      |        |
| SE,DK,FI,NO classes as above   |   |                                     |                       |                        |      |        |
| <b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>  |   |                                     |                       |                        |      |        |
| Category *   | Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>  | Relevant to Claim No. <sup>13</sup> |                       |                        |      |        |
| X  | SE, B, 353784 (KABEL- UND METALLWERKE GUTEHOFFNUNGSHÜTTE AG) 12 February 1973, see figure 1<br><div style="text-align: center;">---</div>   | 1,5,7                               |                       |                        |      |        |
| X  | DE, A, 2208884 (KABEL- UND METALLWERKE GUTEHOFFNUNGSHÜTTE AG) 6 September 1973, see figure 3<br><div style="text-align: center;">---</div>  | 1,7                                 |                       |                        |      |        |
| A  | FR, A1, 2583497 (CAPRI-CODEC S.A.) 19 December 1986, see the whole document<br><div style="text-align: center;">-----</div>   |                                     |                       |                        |      |        |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>* Special categories of cited documents:<sup>10</sup></b></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 50%;"> <p>"T" later document published after the international filing date or priority date and not cited to understand the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div> |   |                                     |                       |                        |      |        |
| <b>IV. CERTIFICATION</b>   |   |                                     |                       |                        |      |        |
| Date of the Actual Completion of the International Search<br><br>17th February 1992  | Date of Mailing of this International Search Report<br><br>1992 -02- 27   |                                     |                       |                        |      |        |
| International Searching Authority<br><br><div style="text-align: center;">SWEDISH PATENT OFFICE</div>  | Signature of Authorized Officer<br><br><div style="text-align: center;"> <br/>           Axel Lindhult         </div> |                                     |                       |                        |      |        |

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 91/00872**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the Swedish Patent Office EDP file on 30/12/91  
The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| SE-B- 353784                              | 73-02-12            | AT-A- 298909               | 72-04-15            |
|   |                     | BE-A- 728535               | 69-08-01            |
|   |                     | CH-A- 494363               | 70-07-31            |
|   |                     | DE-A- 1750116              | 71-01-21            |
|   |                     | FR-A- 2005146              | 69-12-05            |
|   |                     | GB-A- 1210785              | 70-10-28            |
|   |                     | NL-A- 6904661              | 69-10-02            |
|   |                     | US-A- 3534985              | 70-10-20            |
| DE-A- 2208884                             | 73-09-06            | JP-A- 48098425             | 73-12-14            |
| FR-A1- 2583497                            | 86-12-19            | NONE                       |                     |